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(54) **CORPS EN CAOUTCHOUC SUSCEPTIBLE D'ETRE CHAUFFE**
(54) **HEATABLE RUBBER BODY**

(57) Ce corps en caoutchouc (10) susceptible d'être chauffé, notamment profilé d'étanchéité ou tuyau en caoutchouc, est extrudé en un matériau élastique en caoutchouc et comprend un moyen de chauffage électrique qui peut être connecté à une source appropriée de tension. Dans un mode de réalisation, le moyen de chauffage électrique comprend au moins une zone (19) co-extrudée dans le corps en caoutchouc (10) qui par adjonction d'une matière conductrice au matériau élastique en caoutchouc forme une résistance électrique. Dans un deuxième mode de réalisation, le moyen électrique de chauffage peut comprendre une couche conductrice qui forme une résistance électrique sur au moins une zone du corps en caoutchouc (10). Dans les deux cas, la zone de résistance (19) qui forme une résistance électrique est recouverte d'une couche extérieure isolante (18).

(57) A heatable rubber body (10), in particular a sealing profile or rubber hose, is made of an extruded rubber elastic material and has electric heating means that can be connected with an appropriate voltage source. In one embodiment of the invention, the electric heating means have at least one area (19) co-extruded in the rubber body (10) and designed as an electric resistance by admixture of a conductive material to the rubber elastic material. In a second embodiment of the invention, the electric heating means can include a conductive layer which is designed on at least one area of the rubber body (10) as an electric resistance. In both cases, the resistance area (19) designed as an electric resistance is coated with an outer insulating layer (18).

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(57) Abstract

A heatable rubber body (10), in particular a sealing profile or rubber hose, is made of an extruded rubber elastic material and has electric heating means that can be connected with an appropriate voltage source. In one embodiment of the invention, the electric heating means have at least one area (19) co-extruded in the rubber body (10) and designed as an electric resistance by admixture of a conductive material to the rubber elastic material. In a second embodiment of the invention, the electric heating means can include a conductive layer which is designed on at least one area of the rubber body (10) as an electric resistance. In both cases, the resistance area (19) designed as an electric resistance is coated with an outer insulating layer (18).

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ANNEXES TO
INT. PREL. EXAM. REPOR

New Claims 1 to 14

1. A heatable rubber body, more particularly a sealing profile or a rubber hose, the rubber body (10; 30; 40; 50; 60; 70; 81) being extruded from an elastomeric material and comprising an electrical heating means connectable to a suitable voltage source, characterized in that the electrical heating means comprises at least one resistor portion (19; 38; 46; 59; 63; 76; 86) coextruded in the rubber body (10; 30; 40; 50; 60; 70; 81), said resistor portion being configured as an electrical resistor by the the admixture of a conductive substance to the elastomeric material.

2. The heatable rubber body as set forth in claim 1, characterized in that the resistor portion (19; 38; 46; 59; 63; 76; 86) is configured on the surface of the rubber body (10; 30; 40; 50; 60; 70; 81).

3. The heatable rubber body as set forth in claim 1, characterized in that the conductive substance is a metal and/or graphite and/or carbon black and/or a coextruded conductive plastics material.

4. The heatable rubber body as set forth in any of the preceding claims, characterized in that the rubber body (10; 30; 40; 50; 60; 70; 81) is formed of EPDM.

5. The heatable rubber body as set forth in any of the preceding claims, characterized in that the resistor portion (19; 38; 46; 59; 63; 76; 86) of the rubber body is coated by at least one insulating coating (18; 37; 54; 58; 61, 62; 75; 85).

6. The heatable rubber body as set forth in claim 5, characterized in that the insulating coating is a non-conductive lacquer and/or plastics material.

7. The heatable rubber body as set forth in any of the preceding claims, characterized in that the heating means is coupled to an activating element for its actuation.

8. The heatable rubber body as set forth in claim 7, characterized in that the activating element is a timer and/or an ambient temperature sensor and/or an actuating switch and/or motor vehicle central locking system and/or motor vehicle ignition system.

9. The heatable rubber body as set forth in any of the preceding claims, characterized in that the heatable rubber body is a lid weatherseal (10), preferably a motor vehicle trunk lid and/or hood lid weatherseal.

10. The heatable rubber body as set forth in any of the claims 1 to 8, characterized in that the heatable rubber body is a sunroof weatherseal (70).

11. The heatable rubber body as set forth in any of the claims 1 to 8, characterized in that the heatable rubber body is a door weatherseal (30) and/or a door surround.

12. The heatable rubber body as set forth in any of the claims 1 to 8, characterized in that the heatable rubber body is a window guide profile (40; 50).

13. The heatable rubber body as set forth in any of the claims 1 to 8, characterized in that the heatable rubber body is a fluid hose (60), preferably a water hose.

14. The heatable rubber body as set forth in any of the claims 1 to 8, characterized in that the heatable rubber body is a wiper blade (81).

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Heatable Rubber Body

The present invention relates to a heatable rubber body, more particularly a sealing profile or a rubber hose, the rubber body being extruded from an elastomeric material and comprising an electric heating means connectable to a suitable voltage source.

Heatable rubber bodies of the aforementioned kind are already known. A gasket configured as a heatable rubber body for an opening element of a motor vehicle reads from EP-A-0 516 526. This gasket comprises a tubular soft sealing part in the compound of which a flexible electrical resistor is embedded. The resistor consists of a wire configured helical. On application of a voltage the wire heats up and thus the soft sealing part surrounding the wire also.

Such known heatable rubber bodies have, however, a number of drawbacks. For instance, producing the rubber body is relatively complicated and thus cost-intensive since in the many steps in production the helical resistor wire first needs to be shaped and then the soft sealing compound needs to be extruded about the resistor wire. Furthermore, with a rubber body produced as such there may be the problem that the resistor wire becomes detached from the sealing part during use of the sealing means, as a result of which the heat produced in the resistor wire may be transferred to the sealing part only to an inadequate degree thus resulting in a reduction in the heating capacity of the sealing means. To compensate this deficiency in performance the resistor wire would need to be heated to an extent more than necessary. This may result in damage to the seal, however, for instance due to scorching. In conclusion, due to the resistor wire becoming detached from the sealing part, cracks may materialize in the sealing part, detrimenting the sealing effectiveness of the sealing means.

On the basis of prior art as cited it is thus the object of the present invention to sophisticate a heatable rubber body of the aforementioned

kind so that the drawbacks as cited are obviated. More particularly, it is the intention to provide a heatable rubber body permitting facilitated, low-cost manufacture and with which a no-problem heating and sealing effect is assurable.

This object is achieved in accordance with the invention in that the electrical heating means comprises at least one resistor portion coextruded in the rubber body, this resistor portion being configured as an electrical resistor by the admixture of a conductive substance to the elastomeric material. By admixing a conductive substance to the elastomeric material it is firstly assured that there is now no need for a separate resistor wire, thus obviating all of the problems as aforementioned as may occur due to the wire becoming detached from the rubber body. In addition, fabricating the heatable rubber body is greatly simplified since the conductive substances may be coextruded with the rubber body, thus eliminating the need for any complicated separate means of retaining and setting the resistor wire prior to extrusion of the rubber body. When an electric current is applied to the coextruded resistor portion comprising the conductive substance in the rubber body it heats up and this heat can be transferred by the rubber body being in contact with other parts, for instance, parts of a motor vehicle body, to thus prevent, for example freezing of such parts to the rubber body.

In accordance with one preferred embodiment of the invention the resistor portion configured as the electrical resistor is configured on the surface of the rubber body.

The conductive substance is preferably a metal and/or graphite and/or carbon black and/or a coextruded conductive plastics material, although it is understood that using the conductive substance is not restricted to these examples as cited, instead any kind of substance is conceivable as suitable for conducting electric current.

For producing the heatable rubber body in accordance with the invention the conductive substance is blended firstly in powder or granulate form with the crude rubber compound, whereby the amount of conductive substance employed is variable and may be formulated in keeping with the

specific requirements. If, for instance, a large portion of the rubber body needs to be heated or if, for example, low temperatures call for a high heating capacity it is good practice to use a large amount of conductive substances.

The blend of rubber compound and conductive substances produced in this way is coextruded in the rubber body in extrusion thereof, it being of importance in this respect that when fabricated in this way a conductive and thus heatable portion can be configured at any location in the rubber body, thus making a specific and, where necessary, also only localized heating of the rubber body possible. For producing a flow of current in the resistor portion conventional connecting elements are needed to connect the resistor portion to a suitable voltage source. Such connecting elements may be, for example, connectors and the like.

In accordance with another aspect of the present invention the heatable rubber body in accordance with the invention is configured such that the electrical heating means comprises a conductive coating formed on at least one portion of the rubber body as an electrical resistor. In this embodiment the heatable rubber body is formed not by using conductive substances, instead a separate conductive coating is applied to the rubber body after the latter has been produced. Common to both variants is, however, that the gist forming the basis of the present invention, namely avoiding the use of a separate resistor element in the rubber body, is achieved. In this arrangement the advantages and effects already cited relative to the first aspect variant of the present invention apply likewise to the second aspect variant of the present invention.

To advantage the conductive coating is a conductive lacquer and/or a conductive plastics material and/or a metal coating and/or a graphite coating and/or a coating of carbon black. Similar to the situation as for the first aspect variant the conductive coating is not restricted to the materials as aforementioned, instead any material is conceivable suitable for conducting an electric current.

In accordance with the invention the heatable rubber body as described in these aspect variants may be formed of EPDM, however, this material

being cited merely by way of an example so that, of course, other materials may also be employed.

To advantage the coextruded portion of the rubber body configured as an electrical resistor or the conductive coating is coated by at least one insulating coating to prevent a user from coming into direct contact with live parts of the rubber body. Furthermore, the insulating coating may serve as a protective coating to prevent damage such as corrosion and the like to the portion configured as the resistor. In this arrangement the insulating coating may be, for example, a non-conductive lacquer and/or plastics material.

In accordance with another preferred embodiment of the invention the heating means is connectable to an activating element for its actuation. One such activating element may be, for example, an ON/OFF logic circuit; examples of such activating elements being timers and/or ambient temperature sensors and/or actuating switches and/or central locking systems for motor vehicles and/or motor vehicle ignition systems. Here again, this listing is purely of an exemplary nature and is not to be understood as being conclusive.

Making use of the activating element in accordance with the invention provides several advantages. For instance, when the heating element of the heatable rubber body is coupled to an ambient temperature sensor, actuation of the heating element may occur automatically as soon as the outdoor temperature drops below a predetermined threshold value. Coupling the heating element to the central locking system of a motor vehicle has, for example, the advantage that the heating means is activated on actuation of the central locking system, this being particularly important in the examples as described below.

The heatable rubber body in accordance with the present invention may be put to use in a wide variety of forms. A few advantageous areas of application will now be described.

In accordance with the invention the heatable rubber body may be a lid weatherseal, preferably a motor vehicle trunk lid and/or hood lid

weatherseal. However, it is just as conceivable to employ the heatable rubber body as a sunroof or door weatherseal and/or door surround. In addition, it is conceivable to use it as a window guide. In another technical area of application the heatable rubber body may be a hose for fluids, preferably a water hose. Furthermore, it is likewise conceivable to put the heatable rubber body in accordance with the invention to use as the wiper blade of a windscreen wiper. Here again, it is to be understood that the examples as cited are merely by way of example and not conclusive in any way. Instead, the heatable rubber body in accordance with the invention may find use in all applications intending to prevent the freezing of fluids or freezing up of objects.

Two possible applications of the heatable rubber body in accordance with the invention as described above will now be described to make the functioning clear in general. In cold climate motor vehicle operation it often occurs that the door window panes freeze up in the window guides and, as long as the vehicle is cold, cannot be lowered. It is in such a case that, for example, a heatable rubber body configured as a window guide profile is conceivable. The heating element of the rubber body is coupled, for example, to the central locking system of the motor vehicle, i.e. unlocking the doors signals the heating element ON, thus powering it for a predetermined time period. The portion of the rubber body configured as the electrical resistor, e.g. a sealing lip of the window guide profile heats up and unfreezes the door window pane from the window guide profile, thus enabling the door window pane to be opened satisfactorily without resulting in damage to the window guide profile. Another problem often encountered with motor vehicles is, for instance, the freezing of fluids in or on the vehicle. This problem too, can be solved by means of the heatable rubber bodies in accordance with the invention. In this case the heatable rubber body is configured e.g. as a water hose. On application of an electric current to the portions of the rubber body configured as an electrical resistor these are heated, e.g., where windscreen wiper hoses or blades are concerned, to heat up the frozen fluid in the vicinity thereof or the contents thereof to thus preclude freezing.

The invention will now be detailled by way of example embodiments illustrated schematically in the drawing in which:

Fig. 1 is a cross-sectional view of a heatable rubber body in accordance with the invention configured as a trunk lid weatherseal;

Fig. 2 is a cross-sectional view of a heatable rubber body in accordance with the invention configured as a door weatherseal;

Fig. 3 is a cross-sectional view of a heatable rubber body in accordance with the invention configured as a window guide profile;

Fig. 4 is a cross-sectional view of another example embodiment of the heatable rubber body in accordance with the invention configured as a window guide profile;

Fig. 5 is a partial view in perspective of a heatable rubber body in accordance with the invention configured as a fluid hose;

Fig. 6 is a cross-sectional view of a heatable rubber body in accordance with the present invention configured as a sunroof weatherseal;

Fig. 7 is a cross-sectional view of a wiper blade assembly in which the heatable rubber body in accordance with the invention is configured as the wiper blade;

Fig. 8 is a cross-sectional view of the window guide profile as shown in Fig. 3 in which the resistor portion is configured in accordance with a second aspect of the invention.

Referring now to Fig. 1 there is illustrated a first example embodiment in accordance with the present invention in which the heatable rubber body is configured as a trunk lid weatherseal 10. The trunk lid weatherseal 10 consists of a sealing profile 11 comprising in turn a hollow chamber seal 12 and a fastener portion 13. The fastener portion 13 serves for securing the trunk lid weatherseal 10 to a vehicle body flange 20 by means of retaining lips 14 and a reinforcing inlay 15. The reinforcing inlay 15 features a substantially U-shaped cross section and is preferably made of metal The reinforcing inlay 15 has the task of maintaining the fastener portion 13 in the predetermined shape. The hollow chamber seal 12 connected to the fastener portion 13 material-positively comprises a hollow chamber 16.

In the region of the hollow chamber seal 12 facing the trunk lid 21 the trunk lid weatherseal 10 comprises a heating means connectable to a suitable voltage source (not shown), the heating means consisting of a resistor portion 19 coextruded in the hollow chamber seal 12. The resistor portion 19 consists principally of a rubber blend incorporating conductive substances by ways and means as described. The resistor portion 19 is connectable to a voltage source by connections (not shown). To prevent direct contact of the user with the live resistor portion 19 and to prevent the resistor portion 19 from being damaged by external effects the trunk lid weatherseal 10 is coated in the resistor portion 19 with an insulating coating 18. To improve the sealing properties the trunk lid weatherseal 10 additionally comprises in its upper end portion a comb-type sealing lip 17.

When, for example, due to freezing temperatures the trunk lid 21 is frozen to the trunk lid weatherseal 10 the heating means, coupled to an activating element for its activation, is actuated. For example, the activating element may be provided in the form of a vehicle central locking system. When the central locking system is opened current flows through the resistor portion 19, this flow of current passing through the conductive substances incorporated in the resistor portion 19. This flow of current results in the conductive substances and thus the complete resistor portion 19 being heated. Due to this heating effect the trunk lid 21 is unfrozen from the trunk lid weatherseal 10, thus enabling the trunk lid 21 to be released from the trunk lid weatherseal 10 without it being damaged.

Referring now to Fig. 2 there is illustrated a further example embodiment of the present invention in which the heatable rubber body is configured as a door weatherseal 30. The configuration and function of the door weatherseal 30 correspond to that of the example embodiment as shown in Fig. 1. The door weatherseal 30 consists of a sealing profile 31 which in turn is made up of a hollow chamber seal 32 and a fastener portion 33. The fastener portion 33 serves to secure the door weatherseal 30 to a door flange 39. For this purpose the fastener portion 33 comprises retaining lips 34 as well as a reinforcing inlay 35. The reinforcing inlay 35 features in turn a substantially U-shaped cross-section. The hollow chamber seal 32 comprises two hollow chamber seals 36a, 36b each enclosed by the sealing compound. Employing two hollow chamber seals has the advantage in this example embodiment that the weatherseal can be better adapted to the contour of a door (not shown) when the door is closed. In the region of the hollow chamber seal 32 coming into contact with the door, the hollow chamber seal 32 comprises a resistor portion 38 coextruded in the rubber body of the hollow chamber seal 32 and to which a conductive substance has been admixed. In addition, the hollow chamber seal is coated in the region of the resistor portion 38 with an insulating coating 37. This insulating coating 37 has in turn the purpose of protecting the user and the sensitive resistor portion 38. Actuating the heating means formed by the electrical resistor portion 38 is done in turn via an activating element (not shown). To prevent the door weatherseal 30 from being damaged in freezing weather when the door (not shown) is opened the electrical heating means is first actuated. The flow of current through the resistor portion 38 heats it up so that the door weatherseal 30 is unfrozen from the door, after which the door can be opened without damaging the door weatherseal 30.

Referring now to Figs. 3 and 4 there are illustrated two variants of a window guide profile 40 and 50. In the case of the window guide profile 40 as shown in Fig. 3 the window guide profile 40 is received by a window frame 41. The window guide profile 40 consists of a sealing profile 43 comprising at its free ends two sealing lips 44. In this arrangement the shape of the sealing profile 43 and of the sealing lips 44 arranged therein is selected so that a window pane 42 may be introduced

into an interior space formed by the sealing profile 43 and the sealing lips 44. For this purpose the sealing lips 44 are urged into the interior space formed by the sealing profile 43 when the window pane 42 is inserted. Due to their resiliency the sealing lips 44 tend to spring back into their starting position thus achieving an advantageous and reliable sealing of the window pane 42. To prevent the window guide profile 40 from being damaged in freezing weather, when the window pane 42 may freeze to the window guide profile 40, on opening the frozen window pane 42, the sealing lips 44 comprise a resistor portion 46 configured by the admixture of a conductive substance as an electrical resistor. The resistor portion 46 is in turn coated with an insulating coating 45. By heating up the resistor portion 46, done in the same way as already explained with reference to the example embodiments as shown in Figs. 1 and 2, the window pane 42 can be unfrozen from the window guide profile 40 prior to being opened.

Referring now to Fig. 4 there is illustrated a modified form of a window guide profile. The window guide profile 50 illustrated therein consists of a sealing profile 53 secured to vehicle frame parts 51. Securing is done by ways and means as already described above with retaining lips 54 and reinforcing inlays 55. To make the seal against a door gap and against a window pane 52 the window guides 50 comprises sealing lips 56 and 57. In addition, a further sealing lip is provided made up of a resistor portion 59 and an insulating coating 50 provided thereon. In the preferred example embodiment only the sealing lip coming into contact with the surroundings outside is configured as the resistor portion, this resulting from the fact that this portion is the sole portion of the window guide profile 50 which may possibly freeze to the window pane 52 when exposed to freezing temperatures. Referring now to Fig. 5 there is illustrated quite evidently in this example embodiment how the portion of the rubber body configured as the heating means, which is configured by the admixture of a conductive substance as an electrical resistor coextruded with the sealing profile 53, can be configured in the preferred example embodiment only locally in the window guide profile 50. Due to the possibility of precisely arranging the heatable resistor portion 59 in the window guide profile 50 heat may be generated precisely at the location where needed. Furthermore, the cost of producing the window guide profile 50 is reduced by the use of conductive substances being minimally necessary.

Again referring now to Fig. 5 there is illustrated a further variant of the heatable rubber body in accordance with the present invention. In this example embodiment the heatable rubber body takes the form of a fluid hose 60. The fluid hose 60 consists of a resistor portion 63 as well as annular insulating coating 61 and an insulating lining 62. The resistor portion 63 consists of a rubber compound configured as an electrical resistor by the admixture of a conductive substance to the elastomer material. The insulating coating has the purpose of preventing direct contact between the user and the live resistor portion. Due to the fact that water is often transported through such fluid hoses, the fluid hose 60 comprises the insulating lining 62. This insulating lining 62 has particularly the task of protecting the electric current resistor portion from corrosion and similar damage.

The employment of the fluid hose 60 as described has more particularly the following purpose. When such a hose is employed, for example, as a wiper water hose for supplying the windscreen wiper of a motor vehicle there is the risk, especially in freezing weather, of the water freezing in the hose, i.e. use of the windscreen wiper system is no longer possible. When, for instance, the resistor portion of the wiper water hose is connected to the activating element configured as the central locking system of a motor vehicle or to the ignition, an electric current is conducted through the resistor portion 63 when actuated. For this purpose the resistor portion 63 is connectable to a suitable voltage source by connector means (not shown). Due to the conductive substances forming an electrical resistor the resistor portion 63 is heated up by the flow of current. The resulting heat is transmitted to the water frozen in the hose so that it thaws, thus quickly rendering the windscreen wiper system connected to the wiper water hose 60 reusable.

Referring now to Fig. 6 there is illustrated a heatable rubber body in accordance with the invention configured as a sunroof weatherseal 70. The sunroof weatherseal 70 consists of, in turn, a sealing profile 71 comprising a fastener portion 72 and a hollow chamber seal 73. For securing the sunroof weatherseal to the frame of a motor vehicle the fastener portion 72 comprises a finger-type base 77. The finger-type base

77 is adaptable to a groove 78 configured accordingly in the frame of the vehicle, thus enabling the sunroof weatherseal 70 to be fixedly connected to the frame of the vehicle. The hollow chamber seal 73 surrounds a hollow chamber 74, the function of which corresponds to that of the hollow chamber seal already described with reference to Figs. 1 and 2. Since in the case of the sunroof weatherseal 70 the complete hollow chamber seal 73 comes into contact with a sunroof (not shown) the complete hollow chamber seal is configured as a resistor portion 76. For the reasons as explained above the resistor portion 76 is coated with an insulating coating 75. The way in which the sunroof weatherseal 70 works and functions in the same as that as already described in the above example embodiments.

Referring now to Fig. 7 there is illustrated yet another possible application of the heatable rubber body. In this example embodiment the heatable rubber body is part of a wiper blade assembly 80. The wiper blade assembly 80 consists of the wiper blade 81 proper as well as a mount 82. The wiper blade 81 consists of a wiper portion 84 and a fastener portion 83. The fastener portion 83 has the function of holding the wiper blade 81 in the mount 82. For this purpose the fastener portion 83 features recesses 87 engaging grooves 88 recessed correspondly in the mount 82. Due to the fact that the fastener portion 83 is made of a flexible material the wiper blade 81 can be pulled out of the mount 82 when it needs to be replaced. The wiper portion 84 is configured as a resistor portion 86 acting as an electrical resistor by admixing a conductive substance. The wiper portion 84 configured as the resistor portion 86 is coextruded with the fastener portion 83. In the portion of the wiper blade 81 exposed to external effects and with which the user may coming into contact directing an insulating coating 85 is provided. The insulating coating 85 has the protective function as already described above.

For heating up the resistor portion 86 an electric connection 89 is provided which is connectable to a suitable voltage source (not shown). To ensure a secure, non-releasable connection between the electrical connection 89 and the resistor portion 86 the electrical connection has the shape of a needle inserted in the resistor portion 86 of the wiper blade 81, it being for this reason that part of the resistor portion 86 is embedded in the fastener

77 is adaptable to a groove 78 configured accordingly in the frame of the vehicle, thus enabling the sunroof weatherseal 70 to be fixedly connected to the frame of the vehicle. The hollow chamber seal 73 surrounds a hollow chamber 74, the function of which corresponds to that of the hollow chamber seal already described with reference to Figs. 1 and 2. Since in the case of the sunroof weatherseal 70 the complete hollow chamber seal 73 comes into contact with a sunroof (not shown) the complete hollow chamber seal is configured as a resistor portion 76. For the reasons as explained above the resistor portion 76 is coated with an insulating coating 75. The way in which the sunroof weatherseal 70 works and functions in the same as that as already described in the above example embodiments.

Referring now to Fig. 7 there is illustrated yet another possible application of the heatable rubber body. In this example embodiment the heatable rubber body is part of a wiper blade assembly 80. The wiper blade assembly 80 consists of the wiper blade 81 proper as well as a mount 82. The wiper blade 81 consists of a wiper portion 84 and a fastener portion 83. The fastener portion 83 has the function of holding the wiper blade 81 in the mount 82. For this purpose the fastener portion 83 features recesses 87 engaging grooves 88 recessed correspondly in the mount 82. Due to the fact that the fastener portion 83 is made of a flexible material the wiper blade 81 can be pulled out of the mount 82 when it needs to be replaced. The wiper portion 84 is configured as a resistor portion 86 acting as an electrical resistor by admixing a conductive substance. The wiper portion 84 configured as the resistor portion 86 is coextruded with the fastener portion 83. In the portion of the wiper blade 81 exposed to external effects and with which the user may coming into contact directing an insulating coating 85 is provided. The insulating coating 85 has the protective function as already described above.

For heating up the resistor portion 86 an electric connection 89 is provided which is connectable to a suitable voltage source (not shown). To ensure a secure, non-releasable connection between the electrical connection 89 and the resistor portion 86 the electrical connection has the shape of a needle inserted in the resistor portion 86 of the wiper blade 81, it being for this reason that part of the resistor portion 86 is embedded in the fastener

portion 83. Defining the electrical connection 89 on the mount 82 is done via fasteners 90, thus creating between the electrical connection 89 and the resistor portion 86 of the wiper blade 81 a connection with facilitated release which is particularly of importance when the wiper blade needs to be replaced new. Replacement is done by pulling the wiper blade 81 from the mount 82, this simultaneously pulling the needle-shaped electrical connection 89 from the resistor portion 86. Fitting a new wiper blade is done in the reverse sequence, i.e. the needle-shaped electrical connection 89 is inserted in the resistor portion 86 and the fastener portion 83 clamped in place in the mount 82. To improve the guidance of the electrical connection 89 in the resistor portion 86 additional guideways may be provided in the fastener portion 83.

Referring now to Fig. 8 there is illustrated in conclusion an example embodiment in accordance with a second aspect of the present invention in which the resistor portion is configured in the form of a conductive coating configured on the rubber body. This example embodiment represents a modification of the window guide profile as shown in Fig. 3, whereby like elements are identified by like reference numerals. To avoid tedious repetition, reference is made to the above description of the example embodiment as shown in Fig. 3. Different to this example embodiment, however, the window guide profile 40 as shown in Fig. 8 comprises no resistor portion formed by the admixture of a conductive substance. Instead use is made in the preferred example embodiment of a conductive coating 100 as the resistor portion configured on the sealing profile 43. The conductive coating, which in the preferred example embodiment is a conductive lacquer is applied to the sealing lips 44 on completion of the sealing profile 43, the way in which this functions and works being the same as for the resistor portion as shown in Fig. 3. The resistor portion configured as the conductive coating 100 is in turn coated with an insulating coating 45. Due to the heating up in the conductive coating 100, occurring in the same way as in example embodiments as shown in Figs. 1 and 2, a window pane 42 frozen to the window guide profile 40 can be unfrozen from the window guide profile prior to the window being opened.

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In all of the example embodiments as described above a heatable rubber body is described in each case which is simple to produce by coextruding a portion configured as an electrical resistor to a rubber body. Due to the possibility of achieving the electrical resistor by admixing conductive substances, there is now no need for separate resistance elements such as resistor wires and the like, thus eliminating the risk of proper functioning of the heatable rubber body being detrimented thereby.

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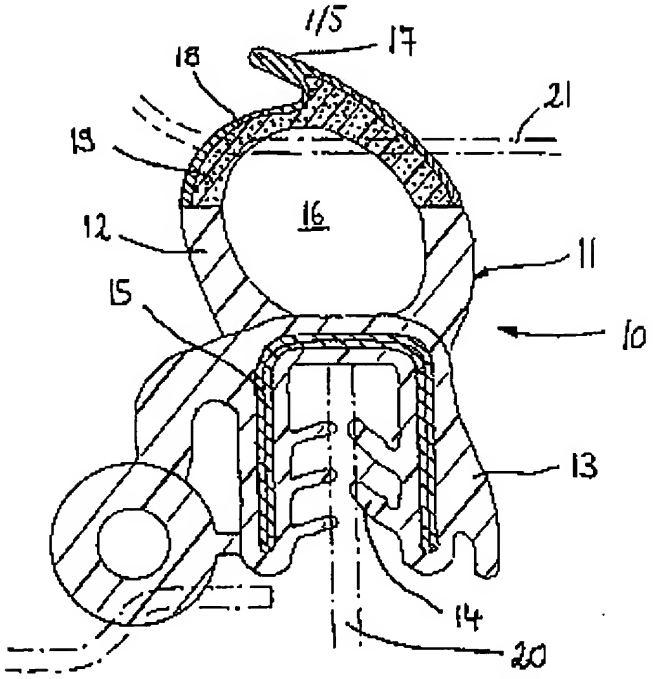

Fig. 1

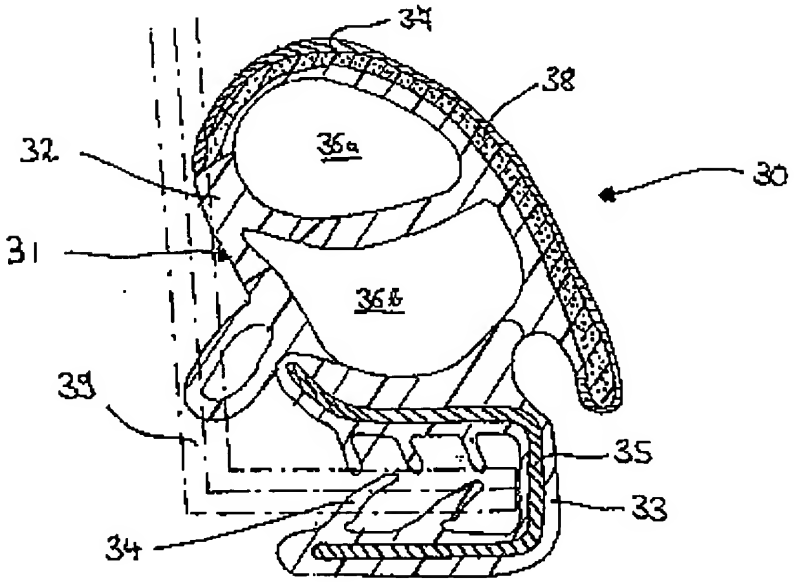

Fig. 2

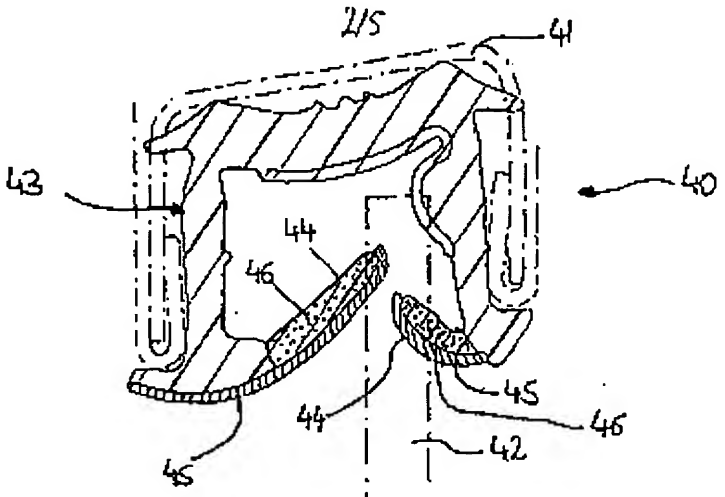

Fig.3

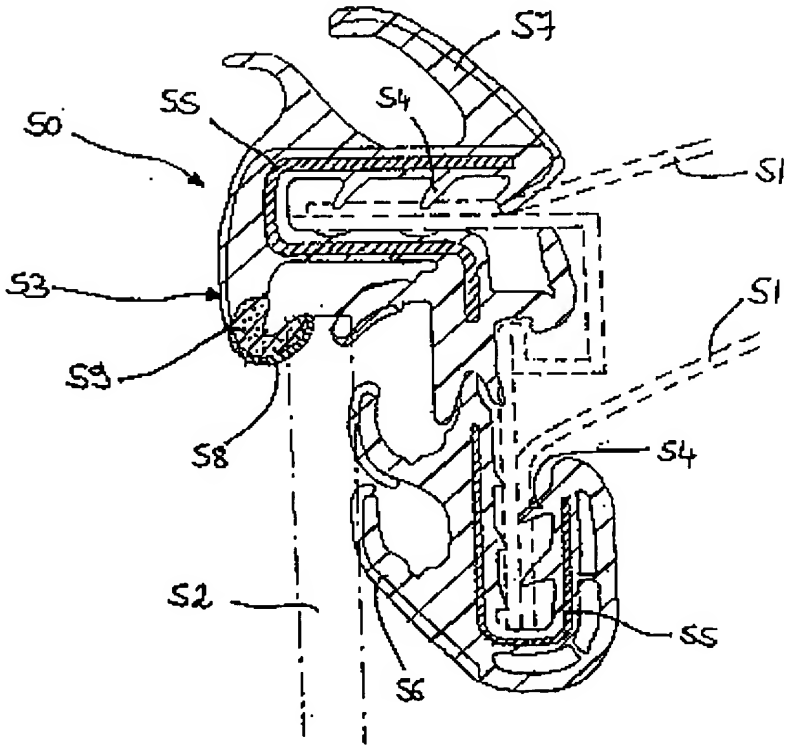

Fig.4

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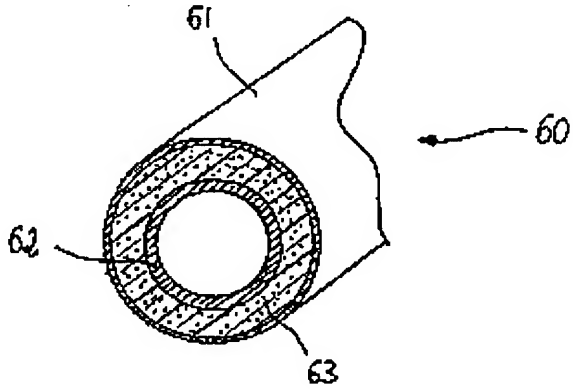

Fig.5

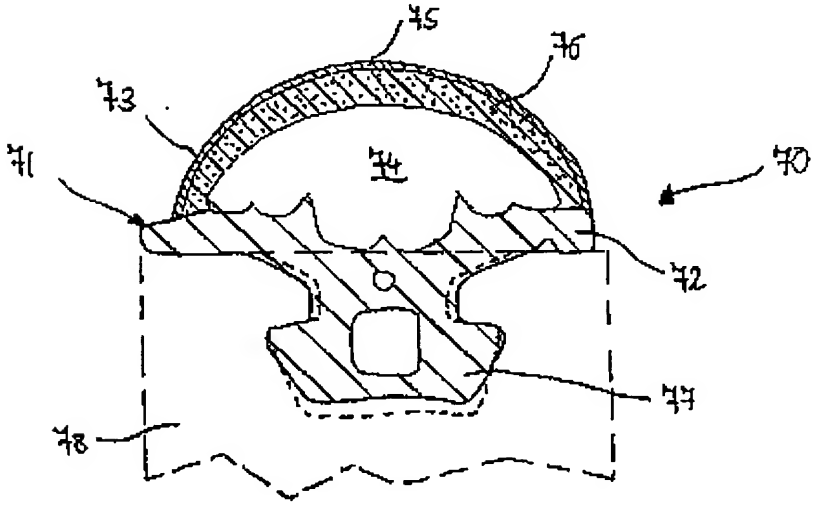

Fig6.

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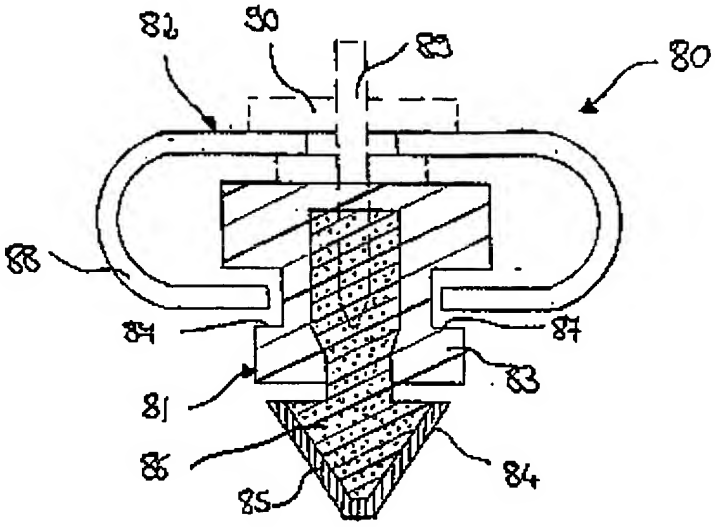

Fig. 7

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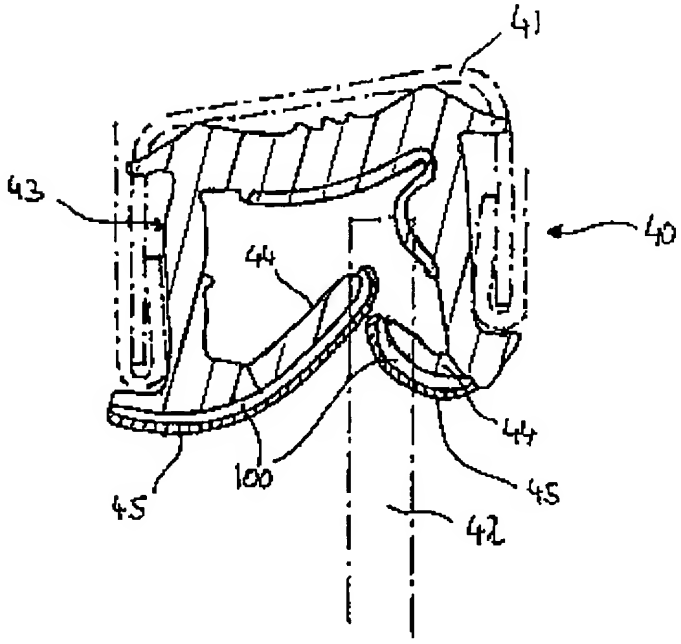

Fig. 8